Influence of Some Innovation Attributes on the Adoption of Growing Sunflower in Rahad Scheme

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ABSTRACT

The vital economic importance of sunflower as one of the oil crops encouraged its introduction to the Sudan in the last twenty years. The production of sunflower crop began in Rahad scheme, as in other irrigated areas in the country, in 1992/93 growing season. Field survey was used to collect data from 100 sunflower growers (adopters) in Rahad Scheme (block 10) in 2002/2003 growing season selected from a total population of 1000-1100 farmers by using the simple random sample technique. An equal number of non-adopters was selected for comparison. The total number of interviewed farmers was 200. The collected data was statistically analyzed using the chi-square test. The results showed significant association (dependency) between adoption of growing sunflower (the innovation) and some of its attributes: Relative advantage on perceived production cost and income، compatibility with farmers need as cash crop and animal feed، complexity associated with use of technical package for sunflower. From the findings of this study, we can conclude that the adoption of this crop was dependent on some innovation attributes and the results were expected to reveal factors influencing adoption of the crop. The authors recommend that more attention should be given by agronomists to this crop in order to improve the yield of the crop and extension services should design special programs for the crop to promote its rate of adoption.

INTRODUCTION

Sunflower (*Helianthus annuus* L.) is produced under irrigated and rainfed conditions in the Sudan especially in Rahad Scheme and Sinnar State. The commercial production of the crop in the country began in 1987/88 growing season for the rainfed sector and in 1992/93

growing season for the irrigated sector. Sunflower is a promising oil crop in the country because of its multiple uses. The crop can be grown under a wide range of climatic conditions. The seeds of sunflower contain high percentage of oil (40-45%) free of cholesterol، and they contain 30% high digestible protein which can be used as a source of food and feed for human beings and poultry. The cake that remains after oil extraction can be used for animal feeding.

Sunflower has two potentialities for the country, first, it can a substitute winter crop in the irrigated sector, second, seeds as raw material for oil industry can increase the capacity of the local crushers،and the extra raw material can be exported to the Arab countries to fill the gap between production and consumption.

Adams (1984) defined an innovation as an idea or practice perceived as new by an individual. The innovation may not be new to people in general but, if it has not yet been accepted by an individual, to that person it is an innovation. Van Den Ban (1990) reported that some innovations are adopted more rapidly than others because the farmers perceive them to have different characteristics. The nature of innovation is not important, but how the farmers perceive them. Cartell (1982) had differentiated between innovation and technology. In his opinion, an innovation is not a technology itself, but a technology is a designed mean or tool and/of any instrument to transfer raw material.

Lever (1970) and Rogers (1983) summed up the factors affecting adoption in technical factors (innovation attributes), community norms and personal characteristics. Rogers and Shoemaker (1971) found that an innovation rejection or discontinuance is associated with factors that include, change in attributes, less satisfaction and availability of an innovation that supercedes the old one. Some innovations diffuse in a few years from their first introduction to wide-spread use but others may need about 50 years according to their characteristics. Bohlen *et al*. (1969), and Rogers (1983) listed five factors which affect the speed with which a new idea is adopted, cost and economic returns، complexity, visibility, divisibility and compatibility. Rogers and

Shoemaker (1971) mentioned similar factors using different terms as follows: relative advantage, complexity, compatibility, friability and observability.

The main objective of this study was to determine the association (dependency) between innovation attributes and adoption of sunflower crop by farmers at Rahad Scheme.

MATERIALS AND METHODS

This study conducted in Rahad Scheme (block 10). The total number of sunflower growers in (block 10) for 2002/2003 growing season was 1000-1100. Ten percent of the population was used to represent adopters behaviour and an equal number of non-adopters was chosen using the simple random sampling technique. Both populations were used to determine the impact of some innovation attributes on the adoption of growing sunflower crop. A questionnaire consisting of 10 questions was developed and the personal interview technique was used to implement the questionnaire. The collected data was statistically analyzed by using chi-square at 0.05 level of significance.

RESULTS AND DISCUSSION

Chi-square test results for adoption of sunflower by relative advantage on perceived production cost compared to wheat are shown in Table 1. There was a significant association (dependency) between adoption of growing sunflower and relative advantage on perceived production cost of the crop compared to wheat. This result agrees with similar findings (Rogers, 1962; Kivilin, 1960; Hashim, 2000).

Table 1. Chi-square test for adoption of sunflower by relative advantage on perceived production cost compared to wheat.

	Perceived production cost compared to wheat				Significance
	Higher than wheat	Equal to wheat	Less than wheat	I don't know	
%of adopters	3	2	87	8	
%of non-adopters	5	6	4	85	*

Significance level P = 0.05.

Chi-square test results for adoption of sunflower by relative advantage on perceived income from sunflower compared to wheat are shown in Table 2. There was a significant association (dependency) between adoption of growing sunflower and relative advantage on perceived income from sunflower compared to wheat. This result also agrees with similar findings (Rogers, 1962; Kiviline 1960, Hashim, 2000).

Table 2. Chi-square test for adoption of sunflower by relative advantage on perceived income from sunflower compared to wheat.

	Perceived production cost compared to wheat				Significance
	Higher than wheat	Equal to wheat	Less than wheat	I don't know	
%of adopters	84	0	2	5	
%of non-adopters	2	6	7	85	*

Significance level P 0.05.

Chi-square test results for adoption of sunflower by compatibility with farmers need for the crop as animal feed are shown in Table 3. There was a significant association (dependency) between adoption of growing sunflower and compatibility with farmers need for the crop as animal feed which means integration of sunflower with the social system which promotes the adoption rate of growing it. This result also agrees with similar findings (Taha, 1998; Hashim, 2000).

Table 3. Chi-square test for adoption of sunflower by compatibility with farmers need the crop as animal feed.

	Use of crop as animal fodder		Significance
	Yes	No	
%of adopters	82	12	
%of non adopters	5	95	*

Significance level P = 0.05.

Chi-square test results for adoption of sunflower by compatibility with farmers need for the crop as a cash crop are shown in Table 4. There was a significant association (dependency) between adoption of growing sunflower and compatibility with farmers need for the crop as

cash crop. This result also agrees with similar findings (Kivilin, 1960؛ Taha, 1998 ; Hashim, 2000). Chi-square test results for adoption of sunflower by perceived complexity associated with use of technical package for sunflower are shown in Table 5. There was a significant association (dependency) between adoption of growing sunflower and complexity associated with use of technical package for sunflower. This result also agrees with similar findings (Kivilin, 1960; Taha، 1998; Elzien, 1998 ; Hashim, 2000).

Table 4. Chi-square test for adoption of sunflower by compatibility
with farmers need the crop as a cash crop

	Perceived of crop as meet the need for cash			Significance
	Yes	No	I don't know	
%of adopters	82	12	5	*
%of adopters	19	30	51	

Significance level P = 0.05.

Table 5. Chi-square test for adoption of sunflower by perceived
complexity associated with use of technical package for sunflower.

	Perceived difficulties associated with the use of technical package for sunflower				Significance
	Easy to be used	Finance Difficulties only	Labour difficulties	Finance and labour difficulties	I don't grown the crop
%of adopters	72	13	1	9	5
%of adopters	3	6	7	4	80

Significance level P = 0.05.

CONCLUSION

From the findings of this study we can conclude that:

1. The adoption behavior of farmers towards this innovation were dependent on some innovation attributes and more farmers were tending voluntarily to adopt growing sunflower in the coming few years.

2. The results revealed factors influencing the adoption of growing sunflower crop, which may help extension services to develop better programs, that in turn may improve adoption rate of

sunflower crop (quantitatively and qualitatively) and consequently community welfare.

ACKNOWLEDGEMENT

REFERENCES

Adams, M.E. 1984. Agricultural Extension in Developing Countries. Singapore Huntsmen Effect Printing Peteha.

Bohlen, G. C. Conphenous, C. Milton, H. Lionberger and M. Rogers. 1969. Adoption of New Ideas. North Central Regional Extension Publication No. 13. New York. U.S.A.

Cartell, C.D. 1982. The social ecology of innovation. A comment of Ashby (Nepal study 1982). Rural Sociology Journal 48 (4):661-665.

Elzein, M.A. 1998. The Influence of Innovation's Attributes on the Integration of the Recommended Wheat Cultural Practices by Gezira Tenants (Central Group). M.Sc. Thesis, University of Gezira, Wad Medani, Sudan.

Hashim, A.A. 2000. The Influence of Innovation's Attributes on the Adoption of Production of Sunflower in Rahad Scheme. M.Sc. Thesis, University of Gezira, Wad Medani, Sudan.

Kivilin, T. E. 1960. Characteristics of Farm Practices Associated with Rate of Adoption. Ph.D. Thesis, Pennsylvania State University، U.S.A.

Lever, B.G. 1970. Agricultural extension in Botswana in Development Studies No. 2. University of Reading, UK

Taha, N.A. 1998. The Influence of Innovation's Attributes on the Adoption of Sowing Improved Sorghum Varieties in Dulga Block (Gezira Scheme). M.Sc. Thesis, University of Gezira, Wad Medani، Sudan.

Rogers, E.M. 1962. Diffusion of Innovation (First edition). The Free Press, New York.

Rogers, E. M. and F.F. Shoemaker. 1971. Communication of Innovation. Across Cultural Approach. The Free Press, New York.

Rogers, E. M. 1983. Diffusion of Innovation (Third edition). The Free Press, New York.

Van Den Ban, A.V. 1990. Agricultural Extension. Agricultural International Centre, Wageningen Agricultural University, the Nethlands.